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Nanomedicine and Nanotechnology

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***Abstract* – This study was conducted to find out how the merger between technology and medical science i.e. nanomedicine turn to to be beneficial in potentially increasing life expectancy. It is a technique which is able to perform human-related tasks such tasks which involves risk to a persons life like safely conducting a tumor removal not leaving behind ant cell causing to trigger again . The question is that weather it will be good to fully adopt this technology despite some of the areas where it lacks to produce or meet its expectations. Creation of such technique is beneficial knowing that it may have disadvantages too. The technology can turn out to be the best thing in medical science but might lack in some abilities hence we have no such prediction that how it will actually behave.**

***Keywords*– Nanotechnology, nanomedicine, nanoimaging, nanodevices, nanocrystals.**

I. INTRODUCTION

Medicine is a field of study with endless scope for improvement possibilities. Over the years medical professionals have taken large steps towards increasing life expectancy by implementing , fusing technological aspects with their knowledge of medicine for better and more effective results. Nanomedicine is one such step towards revolutionising the field of healthcare and medicine.

Nanomedicine is the branch of medicine which is the application of nanotechnology for treatment and prevention of diseases. Nanotechnology as the name suggests consists of smaller/nano tools such as nanorobots, biochemical nanoparticles which are use of diagnosis of any living person.

The European Science Foundation compiled the definition for field of nanomedicine as “the science and technology of diagnosing , treating and preventing disease and traumatic injury, of relieving pain and of preserving and improving human health using molecular tools and knowledge of human body”. They also defined the discilplines of nanomedicine in their research i.e. analytical tools; nanoimaging, nanomaterials and nanodevices ; novel therapeutics and drug delivery system ; clinical issues ; regulatory and toxilogical issues.

Nanomedicine has been in use since ancient times but the Metchinkov and Ehrlich were the inventors of nanomedicine . They are referred to as the modern pioneers of nanomedicine for their research in phagocytosis . They received Noble Prize in medicine for their work .

Robert A. Freitas wrote a book named “Nanomedicine” which is used for theoretical knowledge of the topic.

Reaserch Methodology and Implemetation Method

The question is “ Can nanomedicine potentially extend the human lifespan’. There are various upside to the use of Nanomedicine .

Using technology to intercept human body has its own benefits majorly in treatment of a disease. Whenever a patient is diagnosed with a medical condition, professionals prescribes them a schedule for their dose of medicine, but often it happens that the amount of drug that needs to be consumed is more than what should be given to the patient. In such cases nanomedicine turns out to be a boon. It provides the possibility of delivering drugs/medication to certain cells of the body using “nanoparticles”. This phenomenon is termed as Drug Delivery which is very helpful when it comes to stronger medicines. These medicines often have high side effects to one’s body. This technique is very efficient as it decreases the unnecessary drug consumption reducing the side effects and the feeling of nausea sometimes in certain individuals. This not only is a healthier way of treatment but also cost effective as it uses less drug dosage reducing the cost of medication and the overall treatment. This technique is more efficient using nanodevices as they are faster and tend to have shorter biochemical reaction time. The best thing about this method is that these devices can be easily implanted in our body for further tracking our health and also during treatment is undergoing.

However eventhough they have a large number of benefits yet these nanoparticles and microparticles are inefficient in targeting certain parts/cells of human body, making them not ready for complete implementation .

These devices have some application in medical science, some of these are; Abraxane it is approved by the US Food and Drug Administration, most commonly known as FDA, is a nanoparticle albumin bound paclitaxel or in other words it a an injectable form of paclitaxel. It is used

for the treatment of breast cancer , pancreatic cancer and non-small-cell lung cancer (NSCLC).
Doxil is another one approved by FDA used in treatment of ovarian cancer and multiple myeloma . It was originally approved for the treatment of Kaposi's Sarcoma which is a type of cancer . in this type of cancer the masses of skin , lymphs are formed and the outer side of the skin turns purple. This effects the body by decreasing immunity due to the production of Human herpes virus 8 causing chronic lymphedema which is commonly known as swollen feet. This nanoparticle reduces the factors by the method in which it is encased in the liposomes which increses drug stability and causes less harm to body tissues.
Rapamune is one such drug which is the best example of how nanomedicine can potentially increase life expectancy. Whenever a organ transplant procedure in conducted it is injected if the body does not accept the organ completely, which may cause in organ failure leading to death in some cases. Rapamune is a nanocrystal based drug , these crystals increase the solubility of drug in the blood by increasing the dissolution rate i.e. the rate at which any compound is mixed in aqueous . Due to this the drug absorption in the body improves causing the organ to connect better with the whole bodies system.
Apart from the drug delivery these particles are of greater benefit in the field of oncology, the field of medicine which deals with prevention , diagnosis and treatment of cancer, tumors. These professionals inject these nanoparticles into human body and these particles seep/enter into the tumors showing a better contrast image of the tumor during its removal procedure or while checkup of the status of cancer cells . This is termed as Imaging which provides better contrast image than MRI or ultrasound. This technique is highly gifting when it comes to heart checkups, it can provide better images of where swelling has occured , during angiogenesis(procedure for developing new blood vessels),
for preventing Atherosclerosis (a disease in which there is blockage in heart due to high fat, cholesterol).

II. CONCLUSION

This technology may surely not be completely ready but it is the first step towards the revolution in the field of medical science.
There will come a time when life expectancy will be higher due to this fusion of technology and medical science.

III. FUTURE SCOPE

As we follow the course of time these methods of treatment becomes more handy than the traditional methods. Specially in the field of oncology and procedures related to heart . However better the doctor he/she cannot be efficient enough to see through their patients body. It isn't that these medical professionals aren't the main assets of medical fraternity but a helping hand in the form of nanomedicine can help them execute their jobs better. In the near future the cases where there is the need of such medicine will increase due to the unhealthy lifestyle making them handy to use for the doctors.

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